The information in this chapter was last updated in 1993. Since the money market evolves very rapidly, recent developments may have superseded some of the content of this chapter.

Federal Reserve Bank of Richmond
Richmond, Virginia
1998

Chapter 4
LARGE NEGOTIABLE CERTIFICATES OF DEPOSIT

Marc D. Morris and John R. Walter

Since the early 1960s large denomination ($100,000 or more) negotiable certificates of deposit (CDs) have been used by banks and other depository institutions as a source of purchased funds and as a means of managing their liability positions. Large negotiable CDs have also been an important component of the portfolios of money market investors. As of the end of 1992 outstanding large CDs at large banks were $114 billion.[1]

Large CDs are generally divided into four classes based on the type of issuer because the rates paid, risk, and depth of the market vary considerably among the four types. The oldest of the four groups consists of CDs issued by U.S. banks domestically, which are called domestic CDs. Dollar-denominated CDs issued by banks abroad are known as Eurodollar CDs or Euro CDs. CDs issued by U.S. branches of foreign banks are known as Yankee CDs. Finally, CDs issued by savings and loan associations and savings banks are referred to as thrift CDs.

DOMESTIC CDS

A certificate of deposit is a document evidencing a time deposit placed with a depository institution. The certificate states the amount of the deposit, the date on which it matures, the interest rate and the method under which the interest is calculated. Large negotiable CDs are generally issued in denominations of $1 million or more.

A CD can be legally negotiable or nonnegotiable, depending on certain legal specifications of the CD. Negotiable CDs can be sold by depositors to other

[1] The Federal Reserve stopped collecting weekly data on large negotiable CDs from all large weekly reporting banks as of January 1984. The Federal Reserve, however, continued to collect monthly data on negotiable CDs from the largest (banks with assets greater than $5 billion) of the large weekly reporters through June 1987. Since June 1987, the Federal Reserve has collected data only for all large CDs, a classification that includes both negotiable and nonnegotiable CDs. Throughout this chapter the amount of large CDs outstanding at large weekly reporting banks will be used as a proxy for large **negotiable** CDs of domestic banks. As of June 1987 approximately 70 percent of the largest banks' large CDs were negotiable.

parties who can in turn resell them. Nonnegotiable CDs generally must be held by the depositor until maturity. During the late 1970s and early to mid-1980s, between 60 and 80 percent of large CDs issued by large banks were negotiable instruments. The Federal Reserve stopped collecting separate data on negotiable CDs in 1987.

A CD may be payable to the bearer or registered in the name of the investor. Most large negotiable CDs are issued in bearer form because investors can resell bearer CDs more easily. Registration adds complication and costs to the process of transferring ownership of CDs. Under the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), CDs with original maturities of more than one year must be registered.

Federal banking agency regulations limit the minimum maturity of a time deposit to seven days. Most CDs have original maturities of 1 to 12 months, although some have maturities as long as five years or more. Approximately half of the large CDs issued domestically by U.S. banks that were outstanding at the end of December 1992 had a maturity of three months or less.

Interest rates on CDs are generally quoted on an interest-bearing basis with the interest computed on the basis of a 360-day year. A $1 million, 90-day CD with a 3 percent annual interest rate would after 90 days entitle the holder of the CD to:

$$\$1{,}000{,}000 \times [1 + (90/360) \times 0.03] = \$1{,}007{,}500.$$

This method of calculating interest is known as "CD basis," "actual/360 basis," or "365/360 basis." At some banks, however, interest on CDs is computed on the basis of a 365-day year. When calculated on a 365-day year basis a $1 million, 90-day CD would have to pay a stated rate of 3.04 percent to offer the holder a return equivalent to a CD that paid 3 percent on a CD basis:

$$\$1{,}000{,}000 \times [1 + (90/365) \times 0.0304] = \$1{,}007{,}500.$$

Banks usually pay interest semiannually on fixed-rate CDs with maturities longer than one year, although the timing of interest payments is subject to negotiation.

Variable-Rate CDs Variable-rate CDs (VRCDs), also called variable-coupon CDs or floating-rate CDs, have been available in the United States since 1975 from both domestic banks and the branches of foreign banks. VRCDs have the distinguishing feature that their total maturity is divided into equally long rollover periods, also called legs or roll periods, in each of which the interest rate is set anew. The interest accrued on a leg is paid at the end of that leg.

The interest rate on each leg is set at some fixed spread to a certain base rate which is usually either a composite secondary market CD rate, a Treasury bill rate, LIBOR, or the prime rate. The maturity of the instrument providing the base rate is equal in length to that of the leg. For example, the interest rate on a VRCD

with a one-month roll might be reset every month with a fixed spread to the composite one-month secondary market CD rate. The most popular maturities of VRCDs are 18 months and two years, and the most popular roll periods are one and three months.

VRCDs are used by issuing banks because they improve their liquidity positions by providing funds for relatively long periods. VRCDs are purchased by money market investors who want to invest in instruments with long-term maturities but wish to be protected from loss if interest rates increase. The largest investors in VRCDs are money market funds. Money market funds are allowed by SEC regulations to treat their holdings of VRCDs as if they had maturities equal to the length of the roll.

Throughout much of the 1980s VRCDs accounted for 10 percent or more of outstanding large CDs. The percentage fell rapidly in the 1990s, however, and as of December 1992 VRCDs were only about 2 percent of outstanding large CDs. This decline may have resulted from a diminished concern of investors with the risk of rising inflation and therefore rising interest rates.

Issuing Banks Only money center banks and large regional banks are able to sell negotiable CDs in the national market. Large CDs perform two important functions for these banks. First, large CDs can be issued quickly to fund new loans. Second, they enable banks to limit their exposure to interest rate risk that can arise when there is a difference between the interest rate sensitivity of their assets and their liabilities. For example, a bank may find that on average its assets mature or reprice every nine months while its liabilities mature or reprice every six months. Should interest rates rise, this bank's interest earnings on its assets would rise more slowly than its cost of funds so that its net income would decline. To limit this risk, the bank may increase the average maturity of its liabilities by issuing fixed-rate, negotiable CDs with maturities of one year.

Deposit Notes and Bank Notes In the mid-1980s a number of large U.S. banks began issuing deposit notes and bank notes. Deposit notes are essentially equivalent to negotiable CDs. They are negotiable time deposits, generally sold in denominations of $1 million, have federal deposit insurance covering only $100,000 of the deposit, are sold largely to institutional investors, and normally carry a fixed rate of interest. Deposit notes differ from most negotiable CDs by calculating their interest payments in the same manner as on corporate bonds.

Banks began issuing deposit notes in an attempt to appeal to investors who typically invested in medium-term corporate bonds, so they have maturities in the 18-month to five-year range. U.S. branches of foreign banks are major issuers of deposit notes. There are no data available on outstanding amounts of deposit notes since these notes are reported by banks as large CDs on financial statements to federal regulators.

Bank notes were developed by banks as a way to gather funds not subject to federal deposit insurance premiums. Bank notes are identical to deposit notes except that they are not reported as deposits on issuing banks' financial statements. Instead bank notes are reported along with several other liabilities as "borrowed money." There is no data available on the outstanding amounts of bank notes.

History and Recent Development of Domestic CDs After World War II, rising interest rates led corporations to limit their demand deposit balances, which paid no interest. Demand deposits and currency as a percentage of total financial assets of nonfinancial corporate businesses declined from 29 percent in 1946 to 16 percent in 1960 (Board of Governors 1986, *Flow of Funds Accounts,* pp. 73-74). To replace the lost corporate demand deposits and to attract new deposits from the money market, banks began in 1961 to sell large negotiable CDs.

At the same time that First National City Bank of New York (now Citibank) began issuing large negotiable CDs, the Discount Corporation of New York, a government securities dealer, agreed to make a secondary market in large CDs. Soon other major New York banks began offering large CDs and other leading government securities dealers began making a market in outstanding CDs. Within a year of the initial issue of negotiable CDs by First National City Bank, domestic negotiable CDs outstanding exceeded $1 billion.[2]

During its first decade, the CD market grew rapidly except for two major setbacks. In 1966, and more severely in 1969 and early 1970, domestic CDs outstanding fell dramatically when open market interest rates rose above Regulation Q ceiling rates on large time deposits set by the Federal Reserve. Both times the binding interest rate ceilings reflected the policy of the Federal Reserve to slow the growth in bank loans.

Since banks were unable to raise funds by issuing domestic CDs, they turned to the Eurodollar and commercial paper markets as additional sources of funds. Businesses also raised money by issuing commercial paper. After the failure of the Penn Central Transportation Company in June 1970, however, some borrowers found it difficult to issue commercial paper. The Federal Reserve eliminated interest rate ceilings on large CDs with maturities of less than three months so that banks could return to the domestic CD market and thereby fund loans to businesses that were having difficulty issuing commercial paper. In 1973 the Federal Reserve also dropped the ceilings on rates of large CDs with longer maturities. Ceilings on rates of large CDs have not been imposed since then.

With the exception of the period from 1974 through 1976 when loan demand was low because of a recession, large CDs outstanding grew fairly steadily

---

[2] Detailed expositions of the origin of the domestic CD market are given in Brewer (1963), Fieldhouse (1962), and Treadway (1965).

from the early 1970s until 1982 (see Figure 1). An important factor behind the growth during the late 1970s was the emergence of money market funds (MMFs). Although interest rate ceilings were eliminated in 1973 on large time deposits in amounts of $100,000 or more, they continued to exist for smaller time and savings deposits. In the late 1970s interest rates rose above these ceiling rates and stayed above them for several years. Small investors were able to circumvent the regulatory ceilings and earn a market rate of interest by investing in MMFs, which pooled the savings of many small investors in order to invest in money market instruments. MMFs grew rapidly from only $10 billion in 1978 to $206 billion in 1982, and a large part of their assets were CDs.

To counter the outflow of savings balances from banks into MMFs, Congress authorized banks and thrifts to offer two ceiling-free accounts: the Money Market Deposit Account (MMDA) and the Super NOW. The MMDA was introduced in December 1982 and the Super NOW in January 1983. These accounts, especially the MMDA, proved to be very popular, and by year-end 1983 they had attracted more than $400 billion to commercial banks and thrifts. Some of this money came from MMFs, the total assets of which fell by $46 billion in 1983. The rapid inflow of funds into MMDAs and Super NOWs led banks to cut back on their issuance of large CDs. CDs outstanding at large weekly reporting banks fell $70 billion from their peak in late 1982 to $140 billion at year-end 1983. MMFs' holdings of domestic CDs fell in 1983 from $36 billion to $22 billion.

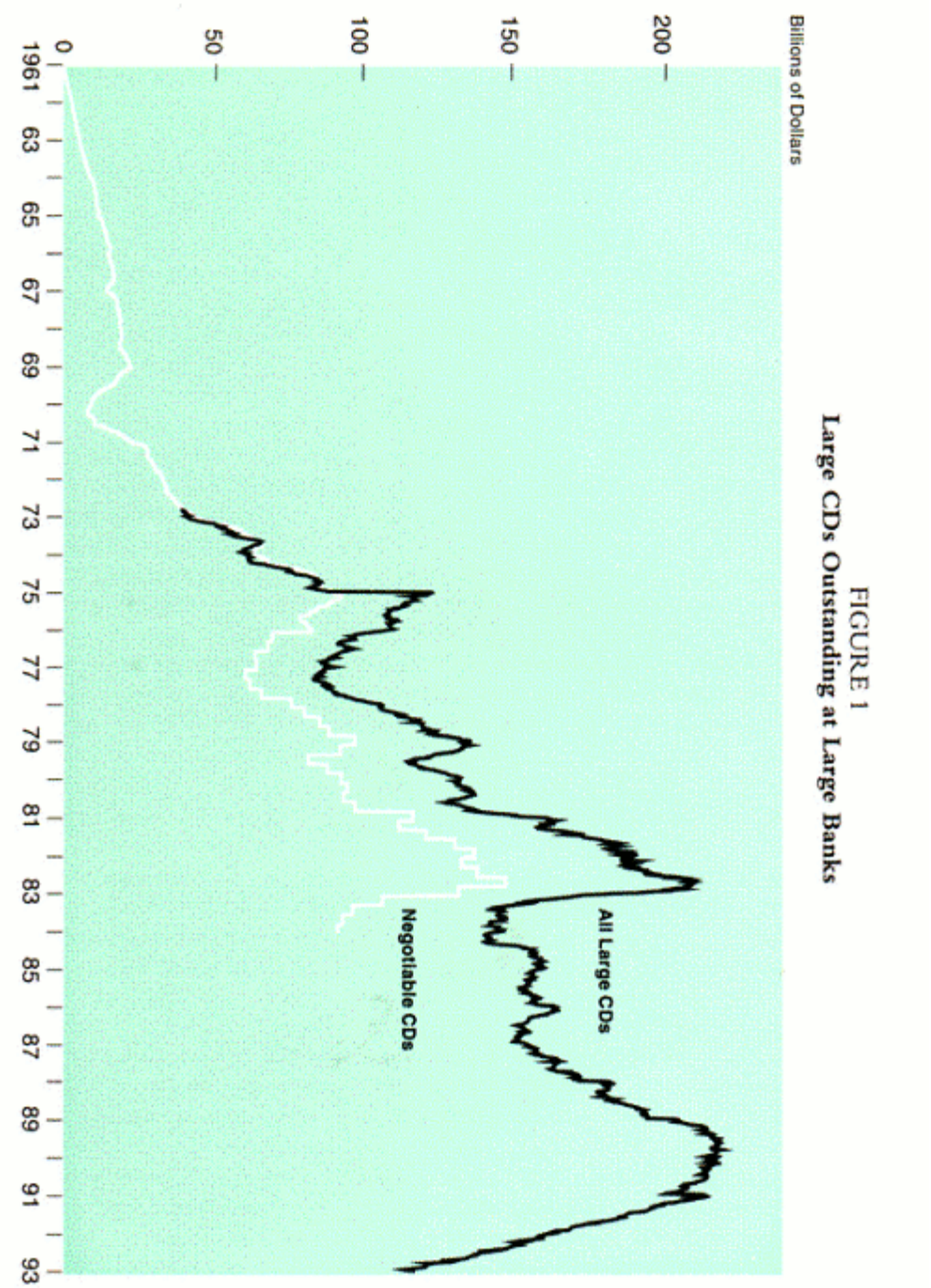
From 1984 until 1990 the amount of large CDs at large banks increased fairly consistently as bank loans and the overall economy grew through the period. As demand for bank loans diminished and bank loan losses expanded on account of the recession that began in 1990, banks began to issue fewer large CDs. Increased capital requirements of the late 1980s and early 1990s also caused some of the largest U.S. banks to slow their asset growth or even to shrink, reducing their need for CD funding. The combination of these factors led to the very significant decline in large CD outstandings at large weekly reporting banks from a peak of $215 billion in early 1991 to $114 billion at the end of 1992.

EURODOLLAR CDS

Eurodollar CDs are dollar-denominated CDs issued by the foreign branches of U.S. banks or by foreign banks located abroad. Eurodollar CDs are negotiable instruments and are usually quoted on an interest-bearing basis. They are primarily issued in London and therefore frequently termed London dollar CDs.

The London branch of First National City Bank of New York issued the first Eurodollar CD in 1966. At the time, market interest rates in the United States were above Reg Q interest rate ceilings, giving banks the incentive to raise funds overseas where there were no interest rate ceilings. Eurodollar deposits also were free of reserve requirements while domestic CD deposits were not.

FIGURE 1
Large CDs Outstanding at Large Banks



Most Eurodollar CDs are fixed-rate, typically with maturities from three to six months. Floating-rate Eurodollar CDs are also issued, usually with longer maturities. Some Eurodollar CDs, known as "Tranche" CDs, are issued in large aggregate amounts (usually between $10 million and $30 million) and then divided, by dealers, into a number of smaller ($10,000-$25,000) certificates. These smaller certificates can then be sold through brokers, investment banks, or an issuing bank's retail sales operation. All of the smaller CDs from a single initial issuance have the same interest rate, issue date, interest payment dates, and maturity.

Eurodollar CDs are sold mostly to institutional investors and large corporations in the United States. Eurodollar CDs are also sold to other banks in the London interbank market.

The major issuers of Eurodollar CDs are the branches of major U.S., Japanese, Canadian, continental banks, and the British clearing banks. While there are no data available on the amount of Eurodollar CDs outstanding, there are data on all foreign currency CDs outstanding in London, the majority of which are Eurodollar CDs (Federal Reserve Bank of New York 1989, p. 15).[3] Table 1 shows the amount of London foreign currency CDs outstanding (i.e., the amount of London CDs not denominated in pounds). Both the amount of London foreign currency CDs issued by U.S. banks and their portion of the market fell steadily from late 1982 to 1991. Japanese banks and other overseas banks replaced banks from the United States as the largest issuers of Euro CDs.

The decline in Eurodollar CDs issued by U.S. banks can be attributed to three factors. The inflow of new retail funds into MMDA and Super NOW accounts in the United States reduced the need to fund with Eurodollar CDs. U.S. banks also significantly reduced their international lending following the international debt crisis of 1982. And the near failure of Continental Illinois in 1984 made international investors wary of large U.S. banks' CDs.

Banks issue Eurodollar CDs to fund international lending and to raise funds to transfer to their home head offices where they can be used for domestic lending. Large U.S. banks continually compare the effective costs of raising funds in the United States and in the Eurodollar markets, and they substitute domestic CDs for Eurodollar CDs when the effective cost is lower in the United States, and vice versa. (The effective cost is the interest paid adjusted for the costs of holding noninterest-bearing reserve requirements and paying deposit insurance.)[4]

---

[3] Some banks issue CDs denominated in yen, Canadian dollars, and ECU in addition to dollars.

[4] Kreicher (1982) provides a thorough discussion of arbitrage between the U.S. and Euro CD markets.

TABLE 1
London Foreign Currency CDs Outstanding
(Billions of U.S. Dollars; Percentage of Total in Parentheses)

Year-End	Total	U.S. Banks	Japanese Banks	British Banks	Other Banks
1980	48.7	26.8(55.0%)	8.8(18.1%)	4.6(9.4%)	8.5(17.5%)
1981	76.1	43.8(57.5%)	11.9(15.7%)	6.6(8.7%)	13.8(18.1%)
1982	92.6	50.3(54.4%)	19.0(20.5%)	9.3(10.0%)	14.0(15.1%)
1983	99.8	46.0(46.0%)	29.2(29.2%)	8.6(8.6%)	16.1(16.1%)
1984	94.7	34.0(35.9%)	33.4(35.3%)	7.6(8.1%)	19.7(20.8%)
1985	92.1	32.1(34.8%)	28.9(31.4%)	8.9(9.7%)	22.2(24.1%)
1986	114.8	27.8(24.2%)	45.4(39.6%)	12.5(10.9%)	29.1(25.3%)
1987	134.5	26.4(19.7%)	59.0(43.8%)	12.8(9.5%)	36.3(27.0%)
1988	140.7	23.1(16.4%)	67.4(47.9%)	9.9(7.0%)	40.3(28.6%)
1989	135.3	18.9(13.9%)	67.3(49.7%)	12.0(8.9%)	37.1(27.4%)
1990	136.9	13.4(9.8%)	58.2(42.5%)	14.4(10.5%)	50.9(37.2%)
1991*	116.3	13.0(11.2%)	36.8(31.6%)	15.5(13.3%)	51.0(43.9%)

* For September 1991.
Note: Starting in 1986 the data includes promissory notes, bills and other short-term paper, which were previously included within the UK monetary sector. In December 1985 this additional amount was 5.3 percent of the total (the sum of CDs and other short-term instruments).
Source: Bank of England, *Quarterly Bulletin,* various issues.

YANKEE CDS

Yankee CDs are negotiable CDs issued by the U.S. branches of foreign banks. The major issuers of Yankee CDs are the New York branches of the well-known international banks of Japan, Canada, England, and Western Europe, which use these funds to lend to their corporate customers in the United States.

Yankee CDs were first issued in the early 1970s. At first Yankee CDs paid a considerably higher yield than domestic CDs. This may have been because foreign banks were not well known and investors had difficulty assessing the credit quality of these banks because of different accounting rules and less available information. More recently, investors' perceptions of foreign banks have improved, and the premium paid by some foreign banks on their Yankee CDs has declined. The effect of the early difference in yields on the cost of raising funds was partially offset by the exemption of foreign banks from Federal Reserve

reserve requirements, which lasted until the International Banking Act of 1978. This exemption probably helped considerably to establish the market in Yankee CDs.

The Yankee CD market grew steadily from the early 1970s to a level of about $35 billion in the early 1980s. The market grew slowly over the rest of the 1980s and totaled $44 billion at the end of 1990. Beginning in 1991, however, Yankee CDs grew rapidly so that by September 1992, Yankee CDs outstanding amounted to $112 billion.

Most of the rapid growth in Yankee CDs in 1991 and 1992 resulted from the December 1990 elimination of reserve requirements on nonpersonal time deposits (time deposits received from those other than individuals or sole proprietorships) with maturities of less than 18 months. Prior to this action, foreign banks wishing to lend dollars to U.S. borrowers faced a 3 percent Federal Reserve reserve requirement when funding these loans with Yankee CDs. Foreign banks could avoid the reserve requirement by booking loans to U.S. borrowers at their offshore branches and funding the loans by issuing CDs in the Euro market. (U.S. banks, however, were prevented by Federal Reserve regulations from taking advantage of this reserve requirement loophole.) Therefore borrowing in the Euro market was encouraged. The December 1990 elimination of the reserve requirement erased the cost advantage the Euro market offered foreign banks and encouraged these banks to issue Yankee CDs.[5]

THRIFT CDS

Only the largest savings and loans are able to issue large negotiable CDs for sale in the national CD market. At the beginning of 1990, outstanding negotiable thrift CDs with original maturities of three months or less amounted to $11 billion.[6] The thrift industry's use of negotiable CDs declined as a result of the market's growing perception of the riskiness of thrifts and the continuing shrinkage of the industry resulting from failures and reorganizations. As of September 1992, outstanding negotiable thrift CDs with original maturities of three months or less amounted to $3.4 billion.

RISK AND RETURN

Because negotiable CDs are issued in denominations well above the $100,000 limit for deposit insurance coverage, investors face the risk that they may not

[5] See McCauley and Seth (1992) for a detailed explanation of this reserve requirement loophole and how it affected foreign bank lending in the United States.

[6] The only negotiable CD data S&Ls report are for those negotiable CDs with maturities of three months or less. This data first became publicly available in 1990.

receive full payment at maturity. The rate investors demand on a bank's negotiable CDs increases as the perceived riskiness of the bank increases.[7] This is often referred to as a credit risk premium.

Large CDs yield a premium over Treasury bills of comparable maturity. This is commonly attributed to three factors. First, as already mentioned, unlike investors in Treasury bills, investors in large CDs are subject to credit risk. Second, although the secondary market in large CDs is well developed, it does not possess the depth of the market in Treasury securities. Investors may demand a slightly higher yield to compensate for this smaller liquidity of CDs. Third, interest on Treasury bills is exempt from state and local income taxes. Consequently, many investors have to earn a higher before-tax yield on CDs than on Treasury securities to get the same after-tax yield. As interest rates rise, the tax exemption advantage of Treasury bills increases so that the premium of CDs over Treasury bills also tends to increase.

As shown by Figure 2, there have been several periods when the spread between three-month CD rates and three-month Treasury bill rates has grown large. The highest spread was about 470 basis points in 1974, due in part to the failure of two large banks (West Germany's Bankhaus Herstatt in June 1974 and Franklin National Bank in October 1974) and to the high interest rates prevailing at the time. The spread was also large in other periods of high interest rates, such as 1969 and 1980-81. Concern over default risk in the summer and fall of 1982 led to a rise in the spread to 275 basis points in September 1982 in spite of falling interest rates. Much of the increased spread can be attributed to the failure of Penn Square Bank in Oklahoma in July 1982 and the subsequent problems at some large banks that were involved with Penn Square, especially Chase Manhattan Bank and Continental Illinois National Bank & Trust Co. Another factor was the disclosure by some large U.S. banks in August 1982 of problems related to their loans to lesser-developed countries. The default risk premium rose again in the late 1980s following the stock market crash of October 1987.

RATINGS

Investors can use rating services to help determine the risk involved in buying a particular bank's CD. There are several rating services, including Standard & Poor's Corporation; Duff & Phelps, Inc.;[8] Moody's Investor Service, Inc.; Thomson Bankwatch, Inc.;[9<] IBCA, Ltd.; and Fitch Investor's Service, Inc.

---

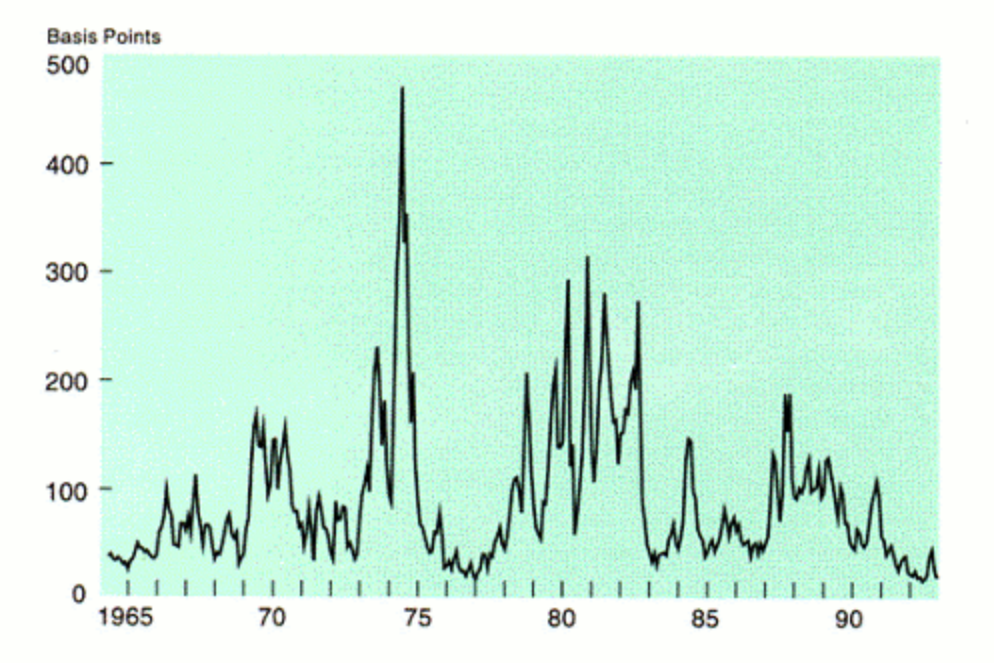
[7] Hannan and Hanweck (1988) give evidence that the market exacts a price for bank risk taking (i.e., market rates are higher for banks that are closer to insolvency). See Gilbert (1990) for a list of other empirical studies on market discipline of banks.

[8] Duff & Phelps rating service and McCarthy, Crisanti & Maffei merged in early 1991.

[9] The Bankwatch rating service was purchased by The Thomson Corporation in March 1989 from the investment firm Keefe, Bruyette & Woods.

FIGURE 2

Yield Spread Between Three-Month CDs and Treasury Bills



A CD rating is based on the rating agency's assessment of the ability of the issuer to redeem the CDs at maturity relative to other issuers. The agencies consider a number of factors, including the bank's liquidity, its interest rate risk, its competitive position in its operating environment, its profitability, its asset quality, the strength of its management, and the general economy.

PRIMARY MARKET

Each day, banks actively issuing large CDs post a set of rates for the most popular maturities—1, 2, 3, 6, and 12 months—at which they are willing to issue CDs. A bank's posted rates are dependent on the rates it can earn investing the funds in loans or investments. When a bank is not interested in raising funds, it will post below-market rates.

A bank tries to sell as many CDs as possible directly to investors. Because banks have limited capability to sell all their CDs directly to investors, however, they often sell some of their CDs to dealers who resell them to investors. In general, smaller banks and foreign banks make the greatest use of dealers when

selling their CDs. Banks also frequently sell to dealers CDs that are hard to sell directly to investors, such as longer-term CDs and variable-rate CDs.

In a typical transaction in the primary domestic CD market a large U.S. money center bank located in New York City issues a CD to a large domestic investor also headquartered in New York City. After the investor and the bank have agreed on the rate, maturity, and amount of the CD, the issuing bank delivers the certificate to the investor's custodian bank. After the custodian has verified the certificate, it debits the investor's account and makes payment to the issuing bank using the Federal Reserve's wire transfer network (Fedwire) to transfer federal funds from its reserve account at the Fed to the issuing bank's reserve account. Issuing banks require payment in federal funds because federal funds are immediately available for use. At maturity the CD is redeemed by presenting the certificate to the issuing bank followed by a Fedwire payment from the issuing bank to the investor's custodian bank. Large out-of-town banks that are active in the national CD market generally issue and redeem through a correspondent bank in New York City. Yankee and thrift CDs have similar mechanics.

The mechanics of a transaction in the Eurodollar CD market are different from those used for domestically issued CDs. The certificates remain in London at the investor's custodian bank while payment is made in New York. Funds are transferred from the investor's New York bank or its New York correspondent to the issuing bank's New York office or New York correspondent. Payment is made two business days after both parties agree to the terms of the sale. Normally payment is made through the Clearing House Interbank Payment System (CHIPS).[10]

Maturing certificates are repaid with interest in New York upon surrender of the certificate to the London issuing bank or London office of the issuer. Several clearing centers in London facilitate primary and secondary market transactions. The First Chicago Clearing Centre, set up by the First National Bank of Chicago, handles most Eurodollar CD transactions.

SECONDARY MARKET

The secondary market in large CDs makes it possible for investors to sell their CDs before they mature and to buy outstanding CDs as an alternative to buying new issues. Like the secondary market in other money market instruments, the market in large CDs is an over-the-counter market made up of dealers and brokers trading over the telephone.

---

[10] CHIPS is an electronic payments system set up by the New York Clearing House Association. Payment on CHIPS is in clearinghouse funds which differ from payment in federal funds in that clearinghouse funds are not "immediately available good funds." Funds paid through CHIPS are not available until the end of the day.

Dealers make a market in large CDs by standing ready to buy and sell them for their own account. Dealers quote rates at which they are willing to buy (bid rate) and sell (ask rate) CDs. The quotes vary with the particular issuing bank and the maturity of the CD. All quotes move together, however, in response to changes in the overall money market, thereby keeping secondary market CD rates in line with rates on other money market instruments. The typical difference between the bid and ask rates for CDs is around 5 basis points. The most heavily traded CDs have the lowest bid-ask spreads.

Dealers trade with customers and with other dealers. Trades between dealers generally involve only top-quality CDs with remaining maturities of six months or less. The typical size of a CD transaction, called a round lot, varies from $5 million to $10 million. Trades between dealers and customers tend to have somewhat lower sizes than trades between dealers.

The daily average dealer positions for all large dealers peaked in 1985 at about $11 billion and fell to just $3.2 billion at the end of 1992. The amount of dealer positions tends to move with the amount of trading done by dealers, indicating that dealer trading of CDs has diminished since the mid-1980s. The decline can be explained by two factors. First, large banks began placing more and more negotiable CDs directly with investors without the aid of dealers. Second, banks issued a smaller dollar volume of CDs.

Brokers intermediate in transactions by bringing together buyers and sellers for a fee. They do not hold an inventory of CDs. Brokers are often used by dealers to do trades with other dealers because of the anonymity they provide.

The secondary market in domestically issued CDs is predominantly located in New York City, where most of the large money center banks and dealers are located. A small proportion of trading takes place in Chicago, San Francisco, and Los Angeles. Eurodollar CDs are traded in both London and New York City.

The mechanics of secondary market transactions are similar to those for primary market transactions. The certificates have to be physically transported between the participants or, more likely, their custodian banks. The settlement date on secondary market transactions in domestic, Yankee and thrift CDs varies depending on the time of trade. Trades executed in the morning are usually settled the same day (cash settlement), whereas trades later in the day are settled the next business day (regular delivery). Trades between dealers are usually settled the next business day regardless of the time of trade. Secondary market trades in Eurodollar CDs are generally made for settlement two business days forward (skip-day settlement). Payments for trades in domestic, Yankee and thrift CDs are made in federal funds through the dealers' clearing banks whereas payments for Eurodollar CDs are made in clearinghouse funds.

REFERENCES

Bank of England. *Quarterly Bulletin*, various issues.

Board of Governors of the Federal Reserve System. *Flow of Funds Accounts, 1946-1969: Annual Total Flows and Year-End Assets and Liabilities.* Washington: Board of Governors, December 1986.

Brewer, C. R. "Negotiable Time Certificate of Deposit." Thesis. Stonier Graduate School of Banking, June 1963.

Federal Reserve Bank of New York. "The International Money Markets in London and First Chicago's Role in Clearing and Settling for Dollar Instruments." New York: Federal Reserve Bank of New York, May 1989.

Fieldhouse, Richard. *Certificates of Deposit.* Boston: The Bankers Publishing Company 1962.

Gilbert, Alton R. "Market Discipline of Bank Risk: Theory and Evidence," Federal Reserve Bank of St. Louis *Review*, vol. 72 (January/February 1990), pp. 3-18.

Hannan, Timothy H., and Gerald A. Hanweck. "Bank Insolvency Risk and the Market for Large Certificates of Deposit," *Journal of Money, Credit, and* Banking, vol. 20 (May 1988), pp. 203-11.

Kreicher, Lawrence L. "Eurodollar Arbitrage," Federal Reserve Bank of New York *Quarterly Review*, vol. 7 (Summer 1982), pp. 10-21.

McCauley, Robert N., and Rama Seth. "Foreign Bank Credit to U.S. Corporations: The Implications of Offshore Loans," Federal Reserve Bank of New York *Quarterly Review,* vol. 17 (Spring 1992), pp. 52-65.

Treadway, Charles T., III. "The Negotiable Certificate of Deposit: A Money Market Instrument." Thesis. Stonier Graduate School of Banking, June 1965.

Wojnilower, Albert M. "The Central Role of Credit Crunches in Recent Financial History," *Brookings Papers*, 1980:2, pp. 277-326.